IN

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

Talagala, et al.

Serial No. 09/721,064

Filed: November 21, 2000

For: FIELD REPLACEABLE STORAGE ARRAY

§ Group Art Unit: 2113
§
§ Examiner: Puente, Emerson C.
§
§ Atty. Dkt. No.: 5681-76600
§ P4635

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

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February 28, 2005
Date

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
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Sir/Madam:

Further to the Notice of Appeal filed December 27, 2004, Appellants present this Appeal Brief. Appellants respectfully request that the Board of Patent Appeals and Interferences consider this appeal.

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I. REAL PARTY IN INTEREST

As evidenced by the assignment recorded at Reel/Frame 011320/0101, the subject application is owned by Sun Microsystems, Inc., a corporation organized and existing under and by virtue of the laws of the State of Delaware, and now having its principal place of business at 4150 Network Circle, Santa Clara, CA 95054.

II. RELATED APPEALS AND INTERFERENCES

No other appeals, interferences or judicial proceedings are known which would be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-31 stand finally rejected. The rejection of claims 1-31 is being appealed. A copy of claims 1-31 is included in the Claims Appendix herein below.

IV. STATUS OF AMENDMENTS

No amendments to the claims have been submitted subsequent to the final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Many enterprises employ server or storage systems that include multiple disk drives and other components. These enterprises may require a high degree of reliability from their server and storage computer systems. If a component of the server or storage system fails, it may cause the entire system to fail or at least to operate in a degraded mode. Since many enterprises cannot afford extended down time from such component failures, it is desirable to be able to quickly address such component failures. One way this problem has been addressed is to make many of the components of such computer systems to be field replaceable or even hot swappable. Field replaceable components

within a system may be easily replaced in the field with a new, functional component. Hot swappable may refer to the ability to replace such a component without powering down the system. In order to support field replacement or hot swapping of components, such systems are typically designed to allow easy access to all components that are to be field replaceable or hot swappable. Such systems typically have access panels and other openings as necessary to allow access to the components that are to be field replaceable or hot swappable. In addition to access panels that may easily be opened in the field, such systems also are typically internally designed to allow access to the replaceable components.

The access panels, internal spacing, special sockets, etc., required to support field replacement or hot swappability means that components may not be packaged as densely in such systems as would otherwise be possible. Also, the requirements to support field replacement and/or hot swappability may make a system more expensive.

Independent claim 1 is directed to a single field replaceable unit (such as system 200 illustrated in FIG. 1). The entire system may be a single field replaceable unit (FRU) that includes multiple individual disk drives to provide a large storage capacity, which is implemented as a single field replaceable unit. The single field replaceable unit includes a processor, system memory, a network interface for connecting to a network, one or more drive controllers, and an array of disk drives coupled to the one or more drive controllers and configured to be organized into one or more RAID logical volumes and presented to client machines as one or more filesystems through the network interface. *See, e.g.*, FIG. 1 and page 10, lines 5-11; and FIG. 2 and p. 11, lines 12-27.

The processor, system memory, network interface, one or more drive controllers, and array of disk drives are all packaged as a single field replaceable unit (FRU) so that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are all configured to not be individually field serviceable or field replaceable. *See, e.g.*, p. 11, line 27 – p. 12, line 2. In some embodiments, the single field replaceable unit is sealed so that the internal components are not readily accessible in the

field. In some embodiments, these components are mounted or configured within the single field replaceable unit so as not to be individually field serviceable or field replaceable by a typical user. For example, the components may be fixed in the unit so that special tools are required for their removal. In other embodiments, the components may be physically arranged so that the means to remove them are not accessible without disassembling large portions of the unit. Various other techniques may be employed inhibit the field serviceability of the components. *See, e.g.*, p. 13, lines 1-12. By not supporting any field replacement and/or serviceability of these internal parts, the system may be designed much more densely than other storage systems that provide an equivalent amount of capabilities. The single field replaceable unit may also eliminate time spent having to trouble shoot individual components in the field. Instead, the entire unit is replaceable.

Independent claim 15 is directed to a system including a single field replaceable unit similar to as described above. The single filed replaceable unit includes a processor, network interface, and array of disk drives all configured to not be individually field serviceable or field replaceable. The system also includes a network coupled to the network interface of the single field replaceable unit, and one or more client machines coupled to the network and configured to access over the network one or more filesystems provided on the array of disk drives within the single field replaceable unit. *See, e.g.*, FIG. 4 and p. 14, line 11 – p. 15, line 10.

Independent claim 22 is directed to a method for providing computing resources as a single field replaceable unit. The method includes assembling a processor, network interface and array of disk drives as a single field replaceable unit (FRU) so that the processor, network interface, and array of disk drives are configured to not be individually field serviceable or field replaceable. The method further includes preinstalling software on the single field replaceable unit configurable to organize the array of disk drives into one or more RAID logical volumes to be presented to client machines as one or more filesystems through the network interface. After assembling and preinstalling the software, the single field replaceable unit is shipped to a user. The

single field replaceable unit, which has no serviceable internal parts, is replaced as a whole upon failure. *See, e.g.*, FIG. 3 and page 13, line 25 through page 14, line 9.

Independent claim 24 is directed to a method for providing computing resources. The method includes configuring a plurality of field replaceable storage units in an enclosure. An example of such an enclosure is illustrated in FIGs. 9A-F. Each field replaceable storage unit includes an array of hard drives and is configured to make the hard drives available on a network. The method further includes detecting a failure in one of the field replaceable storage units, and replacing as a whole the field replaceable storage unit having the failure. *See, e.g.*, FIG. 10 and page 22, line 12 through p. 23, line 11.

Independent claim 30 is directed to a system including an enclosure configured to hold a plurality of individual field replaceable storage units. An example of such an enclosure is illustrated in FIGs. 9A-F. Each individual field replaceable storage unit includes one or more processors and an array of disk drives. The processor and the array of disk drives are configured to provide one or more filesystems to a network. The enclosure is configured so that each individual field replaceable storage unit is individually removable or insertable, and each individual field replaceable storage unit is configured so that the one or more processors and the array of disk drives are configured to not be individually field serviceable or field replaceable so that failed ones of the individual field replaceable storage units are replaced in the enclosure as a whole. See portions of specification noted above.

Independent claim 31 is directed to a field replaceable unit that includes a processor, a system memory, a network interface, one or more drive controllers, and an array of disk drives coupled to the one or more drive controllers and configured to be organized into one or more RAID logical volumes and presented to client machines as one or more filesystems through the network interface. The processor, system memory, network interface, one or more drive controllers, and array of disk drives are all packaged as a field replaceable unit (FRU) sealed to prevent the processor, system memory,

network interface, one or more drive controllers, and array of disk drives from being separately field replaceable. See portions of specification noted above.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1, 2, 6, 12, 13, 15, 16, 18-26 and 28-31 stand finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over "RaQ a fine low cost Web server alternative" by Kevin Railsback (hereinafter "Railsback") in view of Gore, III et al. (U.S. Patent 4,602,164) (hereinafter "Gore").

2. Claims 3, 4 and 7 stand finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over Railsback in view of Gore and further in view of Lui et al. (U.S. Patent 5,812,754) (hereinafter "Lui")

3. Claim 5 stands finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over Railsback in view of Gore and further in view of Lui, et al. (U.S. Patent 5,812,754) (hereinafter "Lui") and Microsoft Computer Dictionary 3rd edition (hereinafter "Microsoft").

4. Claims 8-11 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Railsback in view of Gore in further view of Edmonds, et al. (U.S. Patent 6,230,190) (hereinafter "Edmonds").

5. Claim 14 stands finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over Railsback in view of Gore and further in view of in further view of Stalley et al. (U.S. Patent 5,663,868) (hereinafter "Stalley").

6. Claims 17 and 27 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Railsback in view of Gore in further view of Microsoft.

VII. ARGUMENT

First Ground of Rejection:

Claims 1, 2, 6, 12, 13, 15, 16, 18-26 and 28-31 stand finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over "RaQ a fine low cost Web server alternative" by Kevin Railsback (hereinafter "Railsback") in view of Gore, III et al. (U.S. Patent 4,602,164) (hereinafter "Gore"). Appellants traverse this rejection for at least the following reasons. Different groups of claims are addressed under their respective subheadings.

Claim 1:

The cited art does not teach or suggest a single field replaceable unit wherein the processor, system memory, network interface, one or more drive controllers, and array of disk drives are packaged as a single field replaceable unit (FRU) so that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are configured not to be individually field serviceable or field replaceable. In fact, both Railsback and Gore teach just the opposite. Railsback teaches the importance of scalability (p. 1) and describes that "the RaQ 3i has internal space for a second hard drive" and that "[o]ne major new feature of the RaQ 3i is the inclusion of a PCI slot" that "allows for even further system expansion" (p. 2). Thus, Railsback clearly stresses the importance of system expansion by being able to add (or swap) additional components in the field. Similarly, Gore teaches the field replacement of individual components in a system. Gore address the problem of replacing individual electronic components, or FRUs, within a system in a way that properly maintains the electromagnetic shielding of the system (Gore -- col. 1, lines 54-68, and col. 2, lines 3-7). The FRUs mentioned by Gore at col. 1, lines 42-48, are clearly individual components within a system. Thus, just like at p. 1, lines 11-25, in the Background of the Invention section of the present application, Gore describes the field replacement of individual electronic components of a system. In fact, at col. 5, lines 21-29, Gore teaches that components within his system are "customer serviceable" and replaceable by a user. Likewise, Railsback stresses the field expandability of the RaQ 3i. Therefore, the cited art clearly teaches away from a

single field replaceable unit in which a processor, system memory, network interface, one or more drive controllers, and array of disk drives are packaged as a single field replaceable unit (FRU) so that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are configured not to be individually field serviceable or field replaceable.

In his Response to Arguments section beginning on p. 13 of the Final Action, the Examiner first attempts to rebut this argument by equating Applicants' claim limitation to making the components integral and citing *In re Larson*, 144 USPQ 347 (CCPA 1965) for the proposition that to make integral is obvious. The Examiner's argument is misguided for several reasons. First of all, making a processor, system memory, a network interface, one or more drive controllers, and an array of disk drives integral in a system does not require that these components not be individually field serviceable or field replaceable. A processor and system memory are clearly considered integral parts of any computer system in that they are essential components of a computer system. However, these components are often integrated in a computer system by using sockets or other types of connections that allow them to be field serviceable or field replaceable. Thus, even if it would have been obvious to make the components listed in Applicants' claim 1 integral, that would still not mean that the components were not individually field serviceable or field replaceable. Note that in the case relied upon by the Examiner, *In re Larson*, the CCPA noted that the term "integral" may include combinations of parts. *Id.* at 349. In *Larson*, the CCPA did not equate "integral" with not being individually field serviceable or field replaceable. In fact, in *Larson* the CCPA considered a brake disk connected to a wheel hub by bolts to form an integral unit. Since the components in *Larson* were connected by bolts, they most likely would have been field serviceable or field replaceable. Thus, *Larson* clearly does not support the Examiner's contention that making a processor, system memory, a network interface, one or more drive controllers, and an array of disk drives integral in a system is the same as making the components to not be individually field serviceable or field replaceable. The other meaning of "integral" discussed in *Larson* is a "one piece construction" or "fabrication of the parts from a single piece of metal". *Id.* at 349. This definition of integral clearly cannot apply to a

processor, system memory, a network interface, one or more drive controllers, and an array of disk drives. Therefore, *In re Larson* clearly does not support the Examiner's rejection.

Applicants also note the more recent Federal Circuit case *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983) where the court ruled that when the prior art teaches reasons for not making components integral, then an integral design is not obvious. Similar to the situation in *Schenck*, the relevant prior art here teaches the desirability of making one or more of a processor, system memory, a network interface, one or more drive controllers, and an array of disk drives in a system to be individually field serviceable or field replaceable. Thus, following the reasoning of *Schenck*, Applicants' claim specifying that the processor, system memory, network interface, one or more drive controllers, and an array of disk drives are not individually field serviceable or field replaceable is not obvious.

On p. 14 of the Final Action, the Examiner also attempts to rebut Applicants argument by asserting that "Railsback does not say that problems have to be fixed in the field." However, just because Railsback does not specifically address field serviceability or field replaceability does not mean that Railsback teaches a processor, system memory, network interface, one or more drive controllers, and an array of disk drives that are not individually field serviceable or field replaceable. In fact, the Examiner himself noted on p. 2 of the Final Action that this limitation is not explicitly taught by Railsback. Furthermore, as discussed above, the typical well known implementation for PCI slots used in Railsback for a network card or RAID array card is to provide for field serviceability and replaceability.

The Examiner also states that "[a] device can easily be constructed such that in order for one to add components, one must send the device back to the manufacturer, who will then add the components." This statement amounts to nothing more than the Examiner's own hindsight-based speculation. The Examiner is merely opining in hindsight on how Railsback's system could be manufactured. The Examiner's

speculation is not supported by any cited art. Just because the prior art could be modified as the Examiner has suggested does not make the modification obvious without a suggestion of motivation in the prior art to do so. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Applicants' claim 1 recites a specific set of components that are not individually field serviceable or field replaceable. None of the cited references teach or suggest a single field replaceable unit in which this particular set of components are not individually field serviceable or field replaceable.

On p. 14 of the Final Action, the Examiner also refers to col. 1, lines 45-53 of Gore as teaching a single field replaceable unit. However, the individual field replaceable units in Gore are cards or other electrical components *within a data processing system*. Gore does not teach or suggest making the particular set of components recited in Applicants' claim 1 not individually field serviceable or field replaceable. **In fact, at col. 5, lines 21-29, Gore teaches that components within his system are "customer serviceable" and replaceable by a user.**

Furthermore, the cited art does not teach or suggest an array of disk drives coupled to said one or more drive controllers and configured to be organized into one or more RAID logical volumes and presented to client machines as one or more filesystems through said network interface; wherein said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are packaged as a single field replaceable unit (FRU) so that said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are configured not to be individually field serviceable or field replaceable. The Examiner refers to p. 2 of Railsback. The only mention of an array of disk drives and RAID in Railsback are the following two sentences on p. 2 as follows: "The latter [external SCSI connector] lets you connect external drive enclosures and even RAID arrays to the server." and "Another expansion possibility for this slot would be a RAID array card, allowing you to add larger and more reliable storage to the system." In Railsback, a RAID drive array is an external add-on, not part of the RaQ 3i server. Thus, Railsback teaches just the opposite of packaging an array of disk drives with a processor,

system memory, network interface, and one or more drive controllers as a single field replaceable unit (FRU) so that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are configured not to be individually field serviceable or field replaceable.

In response to this argument, on pp. 14-15 of the Final Action the Examiner again refers to the RAID array card mentioned in Railsback. However, as discussed above, Railsback teaches adding a RAID array card in a PCI slot, which would typically be field serviceable and/or replaceable. Furthermore, the RAID array card mentioned in Railsback is just the RAID controller card, *not the disk drive array*. As noted above, Railsback clearly refers to an *externally connected RAID array*. Thus, the Examiner's reliance on Railsback is completely misplaced.

Claim 2:

In regard to claim 2, the cited art does not teach or suggest a motherboard, wherein said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are attached to said motherboard so as not to be field removable. The Examiner contends that these limitations of claim 2 are taught by Railsback. However, there is clearly no teaching in Railsback of a processor, system memory, network interface, one or more drive controllers, and array of disk drives being attached to a motherboard so as not to be field removable. As discussed above, Railsback clearly teaches the drive array to added by separate expansion, and there is no teaching in Railsback that the other components are not also field removable. Railsback stresses the importance of scalability and expandability. Likewise, Gore teaches the field serviceability of individual electronic components of a system (Gore -- col. 5, lines 21-22). Thus, the cited art actually teaches away from Applicants' claim 2.

In response to this argument, the Examiner states on p. 15 of the Final Action that "[s]ince the unit disclosed in Railsback in view of Gore is a single field replaceable unit, the individual components must be attached to the motherboard so as not to be field

removable." The Examiner appears to be relying on some sort of theory of inherency. However, "in relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). The Examiner clearly has not met the standard for relying on inherency. Moreover, for the reasons given above, Railsback in view of Gore clearly does not teach or suggest a single field replaceable unit wherein the processor, system memory, network interface, one or more drive controllers, and array of disk drives are packaged as a single field replaceable unit (FRU) so that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are configured not to be individually field serviceable or field replaceable. Furthermore, the references explicitly teach that at least some of these components are not attached to a motherboard. For example, the disk drive array mentioned in Railsback is clearly described as being externally connected to the RaQ 3i server. Similarly, Gore teaches components that are customer serviceable (Gore -- col. 5, lines 21-22). Thus, the cited art actually teaches away from Applicants' claim 2.

Claim 6:

In regard to claim 6, the Examiner asserts that as technology is evolving, systems are becoming faster and storage capabilities are continuing to increase in size. Based on this premise, the Examiner states that it would have been obvious for an array of disk drives in a single field replaceable unit to provide storage for at least a quarter of a terabyte of data. The rejection of claim 6 is improper. By considering the future evolution of storage systems, the Examiner is applying an improper timeframe for determining patentability. Patentability must be determined at the time of invention, not according to any future speculation. At the time of Applicants' invention, conventional wisdom on drive arrays that provided at least a quarter of a terabyte of data was to make each drive replaceable. Thus, at the time of Applicants' invention, it clearly would not have been obvious to include a drive array providing at least a quarter of a terabyte of

data as a single field replaceable unit with a processor, system memory, network interface, and one or more drive controllers.

In response to this argument, the Examiner states that changes in size/range are obvious (citing *In re Rose*) and having drive arrays that provide at least a quarter of a terabyte was known at the time of the invention (citing U.S. Pat. No. 6,161,152). The Examiner has apparently misunderstood Applicants' argument. Applicants are not arguing that having a drive array including this much storage was not known at the time of Applicants' invention. Rather, Applicants' argument is that the prior art does not suggest making this much storage in a drive array part of a single field replaceable unit with a processor, system memory, network interface, and one or more drive controllers such that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are configured not to be individually field serviceable or field replaceable. At the time of Applicants' invention, conventional wisdom on drive arrays that provided at least a quarter of a terabyte of data was to make each drive replaceable. Nothing in the Examiner's response, *In re Rose*, or U.S. Pat. No. 6,161,152 addresses this argument.

Claim 12:

In regard to claim 12, contrary to the Examiner's assertions, there is no teaching in Railsback of the RaQ 3i server being configured to issue IP addresses to client machines. Railsback does mention configuring an IP address for the RaQ 3i server, but there is no mention of issuing IP addresses to client machines. Thus, the rejection of claim 12 is improper.

In response to this argument, the Examiner states on p. 15 of the Final Action that this limitation is inherent for the RaQ web server of Railsback. The Examiner also refers to the reference "How Web Servers Work" for the teaching that "each machine on the Internet is assigned a unique address called an IP address" and that a home machine connecting to the Internet has an IP address assigned by the ISP. The Examiner has

apparently confused an ISP with a web server. An ISP and a web server are different entities. An ISP provides access to the Internet for a user and may assign an IP address to the user's computer for use in accessing other computers on the Internet, such as a web server. A web server, such as the RaQ 3i server in Railsback, does not typically assign IP addresses to home users. Thus, the "How Web Servers Work" reference cited by the Examiner actually supports Applicants' argument. The cited art does not teach that Railsback's RaQ 3i web server would issue IP addresses to client machines. Nor would such operation be inherent in Railsback's RaQ 3i web server. In fact, as shown in the "How Web Servers Work" reference, such operation in the prior art is typically performed by ISPs, not by web servers such as Railsback's RaQ 3i web server.

Also, the Examiner's reliance on the "How Web Servers Work" document is improper because this document has not been shown to be a prior art document.

Claim 13:

In regard to claim 13, 20 and 29, the cited art does not teach that the number of physical disk drives of said array of disk drives is fixed in said single field replaceable unit so that additional physical disk drives cannot be added to said single field replaceable unit in the field. Railsback teaches just the opposite by clearly referring to an internal disk drive expansion location on p. 2. The Examiner refers to the FRUs in Gore. However, as discussed above, the FRUs in Gore are individual electronic components of systems. Thus, applying the teachings of Gore to those of Railsback would only suggest that the individual disk drives in Railsback could be field replaceable. The combination of Railsback and Gore clearly does not teach having a fixed number of disk drives.

In response to this argument, the Examiner states on p. 16 of the Final Action that "[s]ince the unit disclosed in Railsback in view of Gore is a single field replaceable unit, there cannot be additional physical drives added to the single field replaceable unit in the field, thus indicating a fixed number of disk drives." The Examiner appears to be relying on some sort of theory of inherency. However, "in relying upon the theory of inherency,

the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). The Examiner clearly has not met the standard for relying on inherency. Moreover, for the reasons given above, Railsback in view of Gore clearly does not teach or suggest a single field replaceable unit wherein the processor, system memory, network interface, one or more drive controllers, and array of disk drives are packaged as a single field replaceable unit (FRU) so that the processor, system memory, network interface, one or more drive controllers, and array of disk drives are configured not to be individually field serviceable or field replaceable. **Furthermore, Railsback explicitly teaches on p. 2 that "the RaQ 3i has internal space for a second hard drive". Thus, the number of drives in Railsback is clearly not fixed.** Similarly, Gore teaches components that are customer serviceable and replaceable (Gore -- col. 5, lines 21-29). Thus, the cited art actually teaches away from Applicants' claim 13.

Claim 15:

In regard to claim 15, for reasons similar to those given above in regard to claim 1, the combination of Railsback and Gore does not teach or suggest a single field replaceable unit (FRU) comprising one or more processors, a network interface coupled to the one or more processors, and an array of disk drives coupled to the one or more processors and the network interface, wherein the array of disk drives is configured to be provided as one or more filesystems through the network interface, wherein the processor, the network interface, and the array of disk drives are configured not to be individually field serviceable or field replaceable. Nor do Railsback and Gore teach such a FRU coupled to a network and accessible by one or more client machines to access one or more filesystems provided by the FRU.

Claim 16:

In regard to claim 16, the combination of Railsback and Gore does not teach or suggest that the array of disk drives within the single field replaceable unit are configured into RAID logical volumes. As discussed above, the RAID array disclosed in Railsback is described as an expansion, not as part of the single field replaceable unit.

Claim 18:

In regard to claim 18, arguments similar to those made above in regard to claim 6 apply.

Claim 19:

In regard to claim 19, arguments similar to those made above in regard to claim 12 apply.

Claim 20:

In regard to claim 20, arguments similar to those made above in regard to claim 13 apply.

Claim 22:

In regard to claim 22, the RAID system in Railsback is described as an add-on, not as something that is **pre-installed prior to shipping** as part of a single field replaceable unit. Also, for reasons similar as given above in regard to claim 1, the combination of Railsback and Gore clearly does not teach or suggest replacing the single field replaceable unit as a whole upon failure, wherein said single field replaceable unit has no serviceable internal parts, wherein the single field replaceable unit includes a processor, network interface and array of disk drives as a single field replaceable unit (FRU) so that the processor, network interface, and array of disk drives are configured not to be individually field serviceable or field replaceable.

In regard to claim 23, for reasons as discussed above, the combination of Railsback and Gore clearly teaches away from the storage capacity of the single field replaceable unit being not individually upgradeable. Gore teaches the replaceability of individual components of a system (which would allow for upgrades) and Railsback specifically teaches the desirability of an additional internal drive bay.

Claim 23:

In regard to claim 23, for reasons as discussed above, the combination of Railsback and Gore clearly teaches away from the storage capacity of the single field replaceable unit being not individually upgradeable. Gore teaches the replaceability of individual components of a system (which would allow for upgrades) and Railsback specifically teaches the desirability of an additional internal drive bay.

Claim 24:

In regard to claim 24, the RAID system in Railsback is described as an add-on, not as part of a single filed replaceable unit. Also, for reasons similar as given above in regard to claim 1, the combination of Railsback and Gore clearly does not teach or suggest replacing the single field replaceable unit having an array of disk drives as a whole.

Claim 26:

In regard to claim 26, arguments similar to those made above in regard to claim 16 apply.

Claim 28:

In regard to claim 28, arguments similar to those made above in regard to claim 6 apply.

Claim 29:

In regard to claim 29, arguments similar to those made above in regard to claim 13 apply.

Claim 30:

In regard to claim 30, for reasons similar to those given above, the combination of Railsback and Gore clearly does not teach or suggest that each individual field replaceable storage unit is configured so that the one or more processors and the array of disk drives are configured not to be individually field serviceable or field replaceable so that failed ones of the individual field replaceable storage units are replaced in the enclosure as a whole. Nor do Railsback and Gore teach an enclosure configured to hold a plurality of such field replaceable storage units.

Claim 31:

In regard to claim 31, for reasons similar to those given above, the combination of Railsback and Gore clearly does not teach or suggest that wherein the processor, system memory, network interface, one or more drive controllers, and array of disk drives are packaged as a field replaceable unit (FRU), wherein the field replaceable unit is sealed to prevent the processor, system memory, network interface, one or more drive controllers, and array of disk drives from being separately field replaceable. To the contrary, Railsback teaches the expandability of its system, and the whole point of Gore is about how to provide a system that can be opened up to replace individual components.

Second Ground of Rejection:

Claims 3, 4 and 7 stand finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over Railsback in view of Gore and further in view of Lui, et al. (U.S. Patent 5,812,754) (hereinafter "Lui"). Appellants traverse this rejection for at least the following reasons.

Claim 3:

Claims 3 is allowable for at least the reasons presented herein regarding its independent base claim, claim 1. Furthermore, none of the cited references suggest one or more fans that are packaged as part of the single field replaceable unit and are configured not to be individually field serviceable or field replaceable. Lui does not teach that its cooling devices are not individually field serviceable or field replaceable. To the contrary, Lui teaches that its fans are filed replaceable.

Claim 4:

Claims 4 is allowable for at least the reasons presented herein regarding its independent base claim, claim 1. Furthermore, none of the cited references suggest one or more fans comprises a row of fans positioned between the array of disk drives and the processor. The Examiner refers to Fig. 7 of Lui. However, this Figure does not show a row of fans positioned between the array of disk drives and the processor of a single field replaceable unit.

Third Ground of Rejection:

Claim 5 stands finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over Railsback in view of Gore and further in view of Lui, et al. (U.S. Patent 5,812,754) (hereinafter "Lui") and Microsoft Computer Dictionary 3rd edition (hereinafter "Microsoft").

Claim 5:

Claim 5 is allowable for at least the reasons presented herein regarding its independent base claim, claim 1. Furthermore, the cited art does not teach that the one or more drive controllers comprise four ATA-type drive interfaces, and wherein said array of disk drives comprises eight ATA-type disk drives. Railsback teaches a SCSI

connector and Lui teaches SCSI and Fibre Channel. Although Microsoft does note the existence of ATA, there is no suggestion to modify the systems of Railsback or Lui to use ATA devices. In fact, the system of Lui would not function as intended if ATA drives were used.

Fourth Ground of Rejection:

Claims 8-11 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Railsback in view of Gore in further view of Edmonds, et al. (U.S. Patent 6,230,190) (hereinafter "Edmonds").

Claim 8:

The cited art does not teach or suggest a single filed replaceable unit including a processor that is configured to execute a UNIX-type operating system and present said array of disk drives as a Network File System (NFS) or Common Internet File System (CIFS) filesystem to a network through said network interface so that the filesystem can be mounted by client machines.

Claim 10:

The cited art does not teach or suggest a single filed replaceable unit including a processor that is configured to execute a Linux-type operating system and present said array of disk drives as a Network File System (NFS) or Common Internet File System (CIFS) filesystem to a network through said network interface so that the filesystem can be mounted by client machines.

Fifth Ground of Rejection:

Claim 14 stands finally rejected under 35 U.S.C.§ 103(a) as being unpatentable over Railsback in view of Gore and further in view of in further view of Stalley, et al. (U.S. Patent 5,663,868) (hereinafter "Stalley").

Claim 14:

Claim 14 is allowable for at least the reasons presented herein regarding its independent base claim, claim 1.

Sixth Ground of Rejection:

Claims 17 and 27 stand finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Railsback in view of Gore in further view of Microsoft.

Claims 17 and 27:

Claims 17 and 27 are allowable for at least the reasons presented herein regarding their respective independent base claims, claims 15 and 24 respectively. Furthermore, Railsback teaches a SCSI connector and Lui teaches SCSI and Fibre Channel. Although Microsoft does note the existence of ATA, there is no suggestion to modify the systems of Railsback or Lui to use ATA devices. In fact, the system of Lui would not function as intended if ATA drives were used.

VIII. CONCLUSION

For the foregoing reasons, it is submitted that the Examiner's rejection of claims 1-31 was erroneous, and reversal of his decision is respectfully requested.

The Commissioner is authorized to charge the appeal brief fee of $500.00 and any other fees that may be due to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5681-76600/RCK. This Appeal Brief is submitted with a return receipt postcard.

Respectfully submitted,

Robert C. Kowert
Reg. No. 39,255
Attorney for Appellants

Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C.
P.O. Box 398
Austin, TX 78767-0398
(512) 853-8850

Date: February 28, 2005

IX. CLAIMS APPENDIX

The claims on appeal are as follows.

1. A single field replaceable unit, comprising:

a processor;

a system memory coupled to said processor;

a network interface for connecting to a network;

one or more drive controllers coupled to the processor; and

an array of disk drives coupled to said one or more drive controllers and configured to be organized into one or more RAID logical volumes and presented to client machines as one or more filesystems through said network interface;

wherein said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are packaged as a single field replaceable unit (FRU) so that said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are configured not to be individually field serviceable or field replaceable.

2. The unit as recited in claim 1, further comprising a motherboard, wherein said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are attached to said motherboard so as not to be field removable.

3. The unit as recited in claim 1, further comprising one or more fans configured to flow air over said array of disk drives and said processor, wherein said one or more fans are packaged as part of said single field replaceable unit and are configured not to be individually field serviceable or field replaceable.

4. The unit as recited in claim 3, wherein said one or more fans comprises a row of fans positioned between said array of disk drives and said processor.

5. The unit as recited in claim 1, wherein said one or more drive controllers comprise four ATA-type drive interfaces, and wherein said array of disk drives comprises eight ATA-type disk drives.

6. The unit as recited in claim 1, wherein said array of disk drives are configured to provide storage for at least a quarter of a terabyte of data in said single field replaceable unit.

7. The unit as recited in claim 1, further comprising a power supply configured to supply power to said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives, wherein said power supply is part of said single field replaceable unit and is configured not to be individually field serviceable or field replaceable.

8. The unit as recited in claim 1, wherein said processor is configured to execute a UNIX-type operating system and present said array of disk drives as a Network File System (NFS) or Common Internet File System (CIFS) filesystem to a network through said network interface so that the filesystem can be mounted by client machines.

9. The unit as recited in claim 8, wherein the filesystem is configured to be accessible by UNIX clients or Windows clients.

10. The unit as recited in claim 1, wherein said processor is configured to execute a Linux-type operating system and present said array of disk drives as a Network File System (NFS) or Common Internet File System (CIFS) filesystem to a network through said network interface so that the filesystem can be mounted by client machines.

11. The unit as recited in claim 10, wherein the filesystem is configured to be accessible by UNIX clients or Windows clients.

12. The unit as recited in claim 1, wherein said single field replaceable unit is configured to provide office network services including issuing IP addresses to client machines, web page server services, and electronic mail services for client machines through said network interface.

13. The unit as recited in claim 1, wherein the number of physical disk drives of said array of disk drives is fixed in said single field replaceable unit so that additional physical disk drives cannot be added to said single field replaceable unit in the field.

14. The unit as recited in claim 1, wherein said single field replaceable unit is configured to be rack-mounted and has a height less than or equal to 1.75 inches.

15. A system, comprising:

a single field replaceable unit (FRU) comprising:

one or more processors;

a network interface coupled to said one or more processors; and

an array of disk drives coupled to said one or more processors and said network interface, wherein said array of disk drives is configured

to be provided as one or more filesystems through said network interface;

wherein said processor, said network interface, and said array of disk drives are configured not to be individually field serviceable or field replaceable;

a network coupled to said network interface of said single field replaceable unit; and

one or more client machines coupled to said network and configured to access over said network said one or more filesystems provided by said array of disk drives within said single field replaceable unit.

16. The system as recited in claim 15, wherein said array of disk drives within said single field replaceable unit are configured into RAID logical volumes.

17. The system as recited in claim 15, wherein said array of disk drives within said single field replaceable unit are ATA-type disk drives.

18. The system as recited in claim 15, wherein said single field replaceable unit is configured to provide storage for at least a quarter of a terabyte of data.

19. The system as recited in claim 15, wherein said single field replaceable unit is configured to provide office network services including issuing IP addresses to said client machines, web page server services, and electronic mail services for said client machines over said network.

20. The system as recited in claim 15, wherein the number of physical disk drives of said array of disk drives is fixed in said single field replaceable unit so that additional disk drives cannot be added to said single field replaceable unit in the field.

21. The system as recited in claim 15 comprising a storage rack having multiple ones of said single field replaceable unit coupled together over said network.

22. A method for providing computing resources, comprising:

assembling a processor, network interface and array of disk drives as a single field replaceable unit (FRU) so that said processor, said network interface, and said array of disk drives are configured not to be individually field serviceable or field replaceable, and wherein said processor, said network interface, and said array of disk drives are configured to provide one or more filesystems to client machines through said network interface;

preinstalling software on said single field replaceable unit configurable to organize said array of disk drives into one or more RAID logical volumes to be presented to client machines as one or more filesystems through said network interface;

after said assembling and said preinstalling, shipping said single field replaceable unit to a user; and

replacing said single field replaceable unit as a whole upon failure, wherein said single field replaceable unit has no serviceable internal parts.

23. The method as recited in claim 22, wherein the storage capacity of said single field replaceable unit is not individually upgradeable, the method further comprising upgrading the computer resources by the user installing one or more additional ones of said single field replaceable unit.

24. A method for providing computing resources, comprising:

configuring a plurality of field replaceable storage units in an enclosure, wherein each field replaceable storage unit comprises an array of hard drives and is configured to make the hard drives available on a network;

detecting a failure in one of the field replaceable storage units; and

replacing as a whole the field replaceable storage unit having the failure.

25. The method as recited in claim 24, further comprising expanding the computing resources by adding one or more additional field replaceable storage units to the enclosure, wherein each additional field replaceable storage unit comprises an array of hard drives and is configured to make the hard drives available on the network.

26. The method as recited in claim 24, wherein the array of hard drives within each field replaceable storage unit is configured into RAID logical volumes.

27. The method as recited in claim 24, wherein the array of hard drives within each field replaceable storage unit are ATA-type disk drives.

28. The method as recited in claim 24, wherein each field replaceable storage unit is configured to provide storage for at least a quarter of a terabyte of data.

29. The method as recited in claim 24, wherein the number of hard drives of each array of hard drives is fixed in each field replaceable storage unit so that additional hard drives cannot be added to individual field replaceable units in the field.

30. A system, comprising:

an enclosure configured to hold a plurality of individual field replaceable storage units, wherein each individual field replaceable storage unit comprises:

one or more processors; and

an array of disk drives coupled to said one or more processors, wherein said processor and said array of disk drives are configured to provide one or more filesystems to a network;

wherein said enclosure is configured so that each individual field replaceable storage unit is individually removable or insertable, wherein each individual field replaceable storage unit is configured so that said one or more processors and said array of disk drives are configured not to be individually field serviceable or field replaceable so that failed one of said individual field replaceable storage units are replaced in said enclosure as a whole.

31. A field replaceable unit, comprising:

a processor;

a system memory coupled to said processor;

a network interface for connecting to a network;

one or more drive controllers coupled to the processor; and

an array of disk drives coupled to said one or more drive controllers and configured to be organized into one or more RAID logical volumes and presented to client machines as one or more filesystems through said network interface;

wherein said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives are packaged as a

field replaceable unit (FRU), wherein said field replaceable unit is sealed to prevent said processor, said system memory, said network interface, said one or more drive controllers, and said array of disk drives from being separately field replaceable.

X. EVIDENCE APPENDIX

No evidence submitted under 37 CFR §§ 1.130, 1.131 or 1.132 or otherwise entered by the Examiner is relied upon in this appeal.

XI. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.